



Presentation Topic:

Distributed Energy Resources Command, Control & Energy Data Management

Utilizing Wideband Communication Systems & Products
To Implement

Upside Down SCADA

Introducing EtherServe™ Products

EtherSCADA™

EtherAMR™

- the next generation in utility automation management -

Thank you
for
inviting
RAI



RAI

Utility Automation



RAI

Goal: Implement superior
automation for utilities.

RAI

EtherServe Products



Markets Served

SCADA

Substation Automation

Energy Management

Load Control

D/A (Distribution Automation)

AMR

Scope of Work

Design Systems

Supply Equipment

Integrate Equipment

Convert Protocols

Combine Legacy & New

Multiple Protocols

Write Software

Build Equipment

Direct Installation

Troubleshoot

Train

Offices

Spokane, WA (headquarters)

Salem, OR

Bellevue, WA

Yakima, WA

Salt Lake City, UT

Boise, ID

RAI Designs:

- Are the most flexible available
- Are fastest to install
- Easily allow legacy equipment
- Can meet individual needs
- Are open – Can include any protocol
- Include multiple protocols
- Are cost effective

RAI will turn
SCADA
upside down

TRADITIONAL SCADA

Alarms



Master Computer

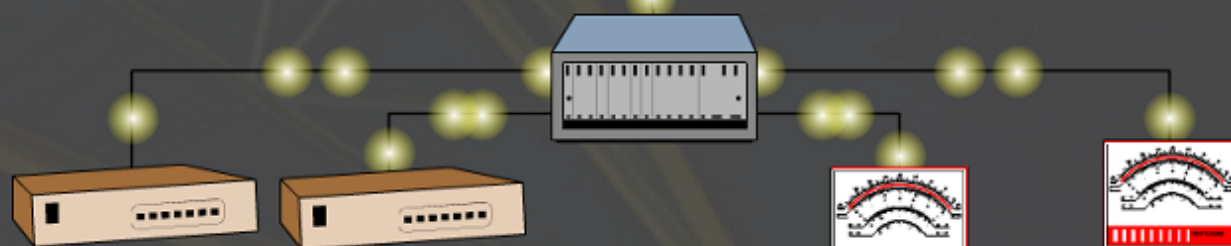
Master Software

Proprietary Software
for
Command, Control & Energy Data
Management

Polling Communications

Simply not possible to implement with
Envisioned Distributed Resources
at every Residential unit.

RTU and/or Communications Processor



IED

IED



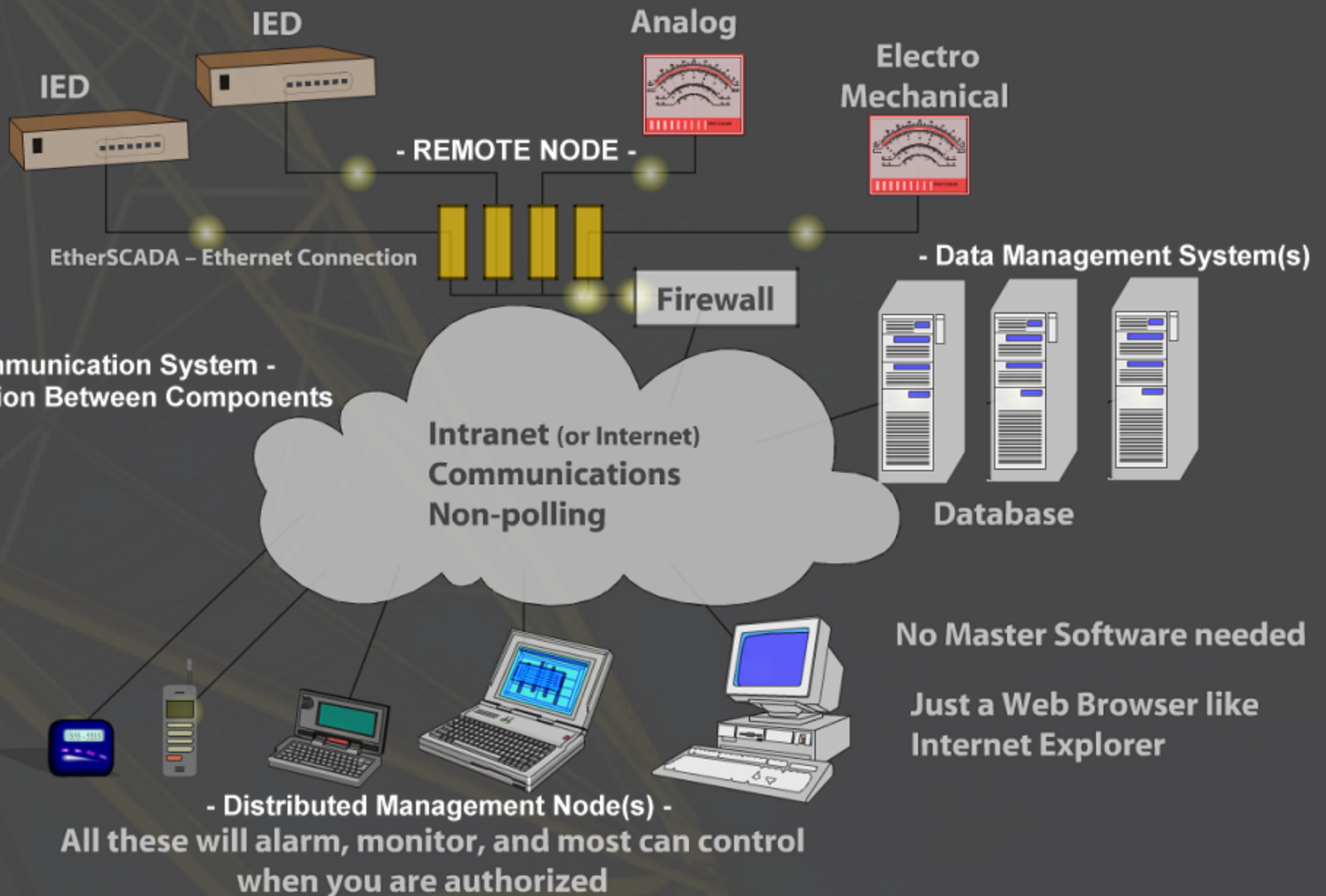
Analog



**Electro
Mechanical**

UPSIDE DOWN SCADA

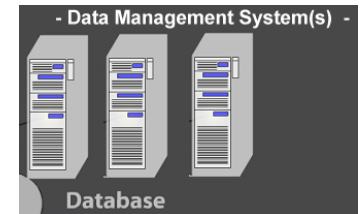
EtherSCADA™ by RAI



Individual Elements In Wideband Upside Down SCADA

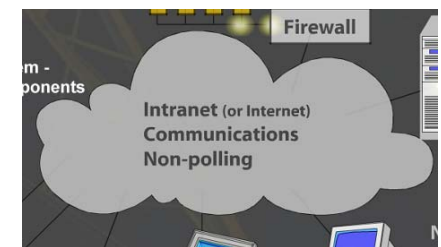
The Distributed Resource Command & Control Total Energy Management System Components

- The Remote Node Component
- The Central Data Management System Component
- The Distributed Management Node Component



The Communication System – Provides the Connection Between Components

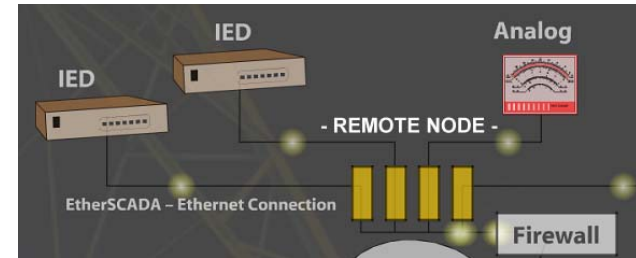
- International IP Communication Structure
- National IP Communication Structure
- Wide Area Data Transportation Service Provider
- Local Area Network



The Distributed Resource Command, Control Total Energy Management System Components

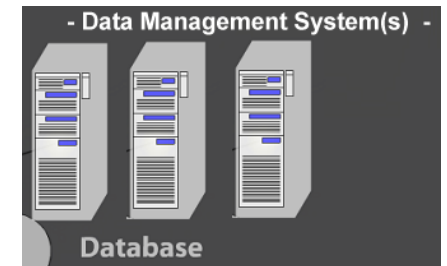
- **The Remote Node Component –**

- Functionality Similar to RTU
- Highly Distributed & Modular
- Local Management Interface
- Multiple Data Base Compatible
- IP Compatible
- Multi-Functional Hardware
- Non-proprietary HMI Interface
- WEB Enabled
- Take Advantage of the High Capacity Web Server Technology



- **The Central Data Management System Component –**

- High Capacity Non-proprietary Web Server Technology
- Non-proprietary Database Requirement
- Non-proprietary HMI Interface
- Modular to Support Millions of Resource Nodes



- **The Distributed Management Node Component –**

- Non-proprietary HMI Interface
- Non-Specific Operating System



The Communication System – **Provides the Connection Between Components**

- **International IP Communication Structure**
 - It exists
- **National IP Communication Structure**
 - It exists
- **Wide Area Data Transportation Service Provider**
 - Connection to the National and International Infrastructures
 - Options Exist
- **Local Exchange Carrier - CLEC - ILEC**
 - Frame Relay
 - DSL
 - ISDN
- **Cable TV Systems**
 - Set Top Box
 - Modem
- **Regional Data Transport Service Provider**
 - VSAT Systems
 - NoaNet – in conjunction with Local Utility
- **Local Electric Utility**
 - Fiber Optic systems
 - Wireless Systems
 - Cable TV Service Provider
- **Local Area Network**
 - Options Exist
 - Wired Infrastructure
 - Wireless Infrastructure – WI-FI & Blue-Tooth (both IEEE standards)
 - Power Line Carrier – HomePlug Network

EtherSCADA / EtherAMR

Base Module



The Remote Node Component

Energy Management

- 3 to 5 minute data
- KYZ inputs
- RS 232 connection (smart meter)
- No polling
- Meter change-out not necessary

Energy Management

Options:

- Remote reprogramming
- Battery back-up
- Request to add load

Energy Management

Display:

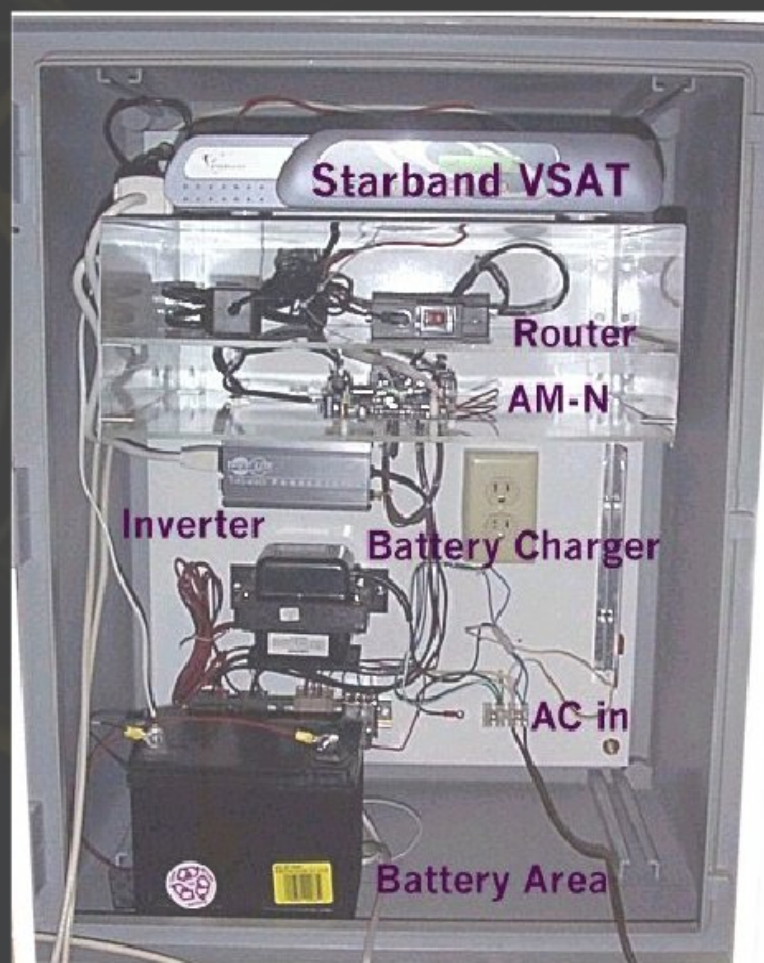
- MS Explorer
- 7-40 days of data stored
- Serves web pages

Energy Management

Software:

- Numerous display options
- Monthly charge
- Customer owned server and software
 - Maintained by others
 - Maintained by utility

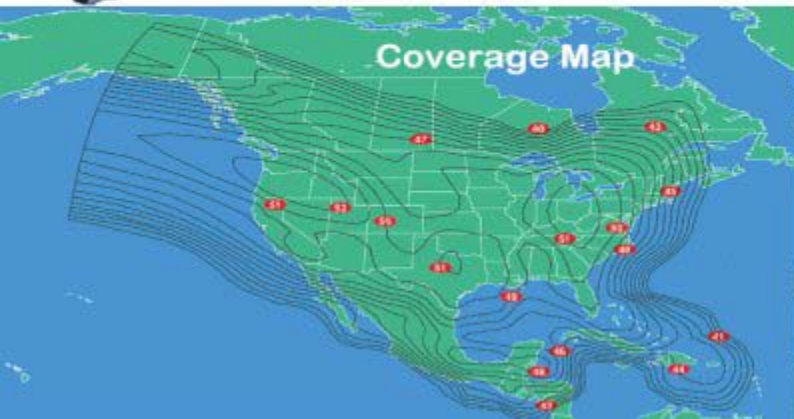
Energy Management





Skystar 360E

The "Always On" High-Speed Internet Connection



- **Ultimate Wireless Solution**
- **2-Way Satellite**
- **Dedicated Connection**
- **Fast Internet Access** 128 k outbound – 640 K Inbound
- **Cost Effective**
- **Multi Business Support**
- **DSL Alternative**

VSAT

Very Small Aperture Terminal for 2-way Satellite Communications

Two-Way Satellite Service Area

Here is an EIRP map (provided by Americom). This map shows the areas that can be reached with the Two-Way Connexstar service. The service is provided on AMC-6 (GE-6).

Most areas can be covered with the standard .90M dish. If you are located in the fringe area of the signal, a larger dish may be needed. This system will work in most of Canada, United States, Mexico and Caribbean.

Purchase

Monthly: \$149

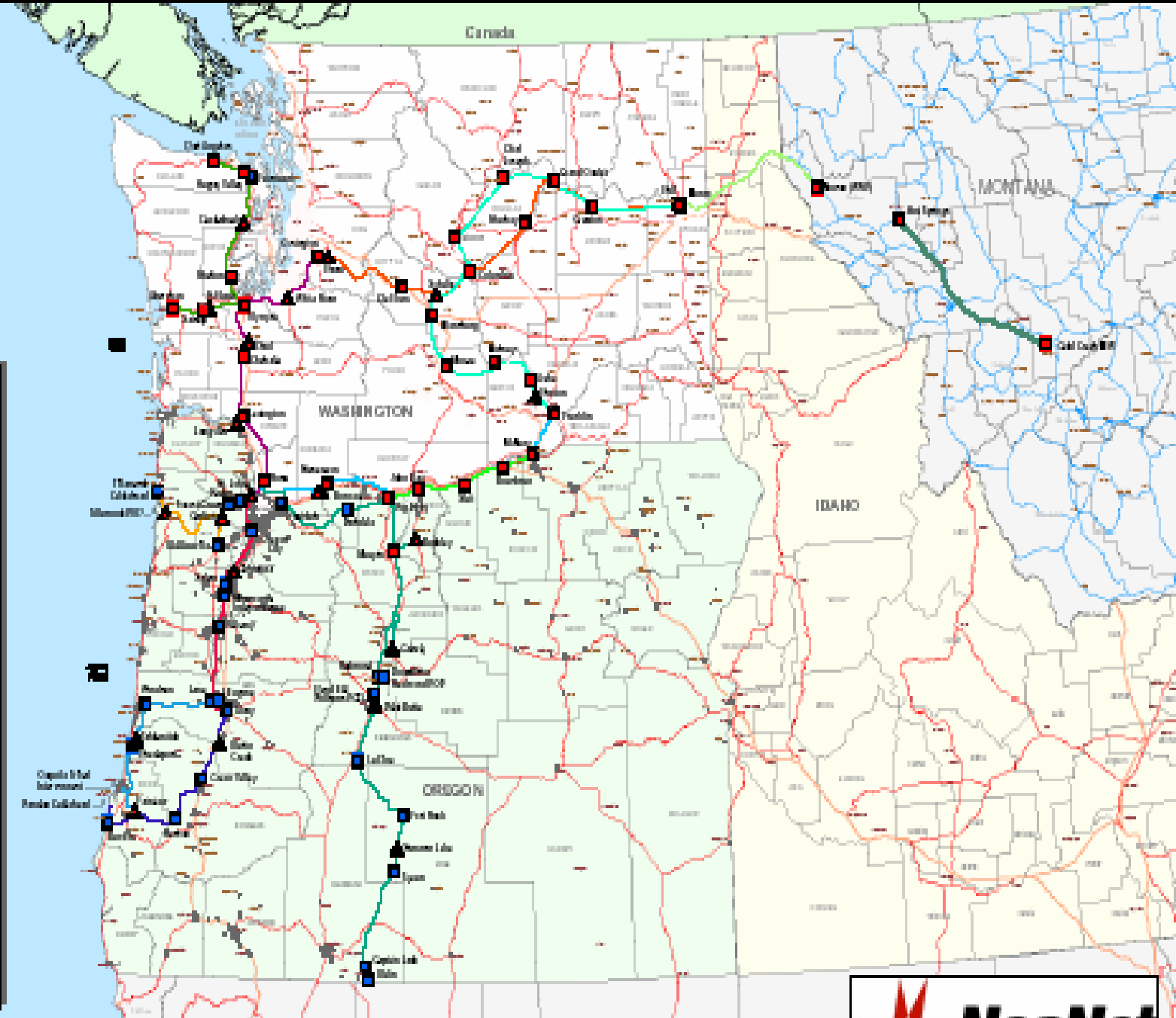
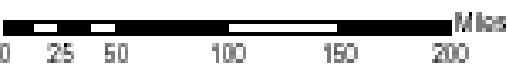
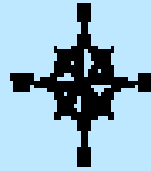
Install: *Dependant on location / Varying from \$500 and up

Equipment (Dish and Modem): *Starts at \$1,721

Contract: 3 Years

* Contact RAI for Quote

Pacific Northwest Overview

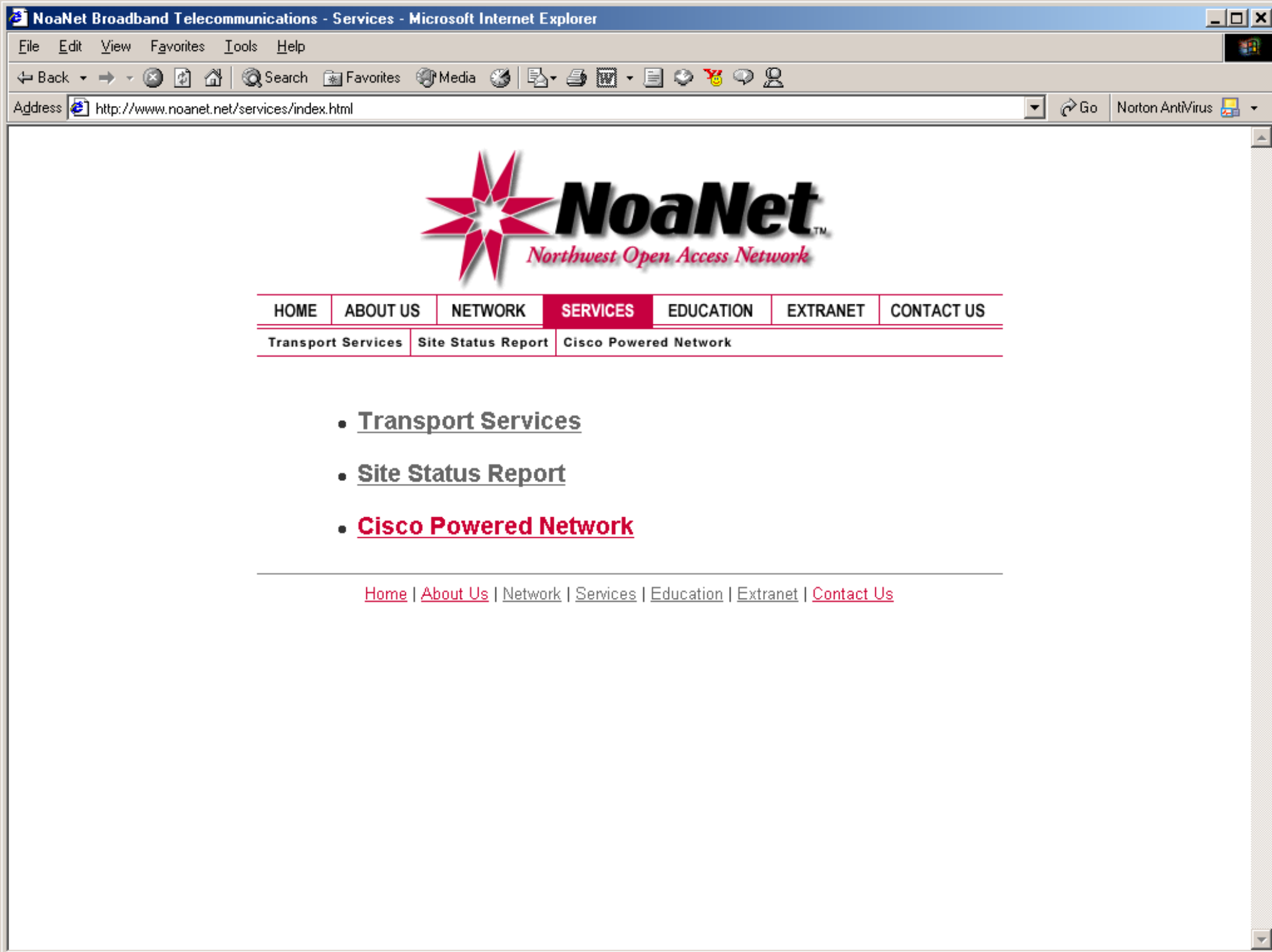


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Infrastructure

The fiber optic network parallels BPA's transmission system, covering much of the Pacific Northwest and creating an economical opportunity for rural telecommunication needs. NoaNet has licensed fibers on the over 2100-mile fiber optic loop that BPA has installed to operate its electric transmission system in Washington, Oregon, Idaho and Montana. The fiber routes and loops can be viewed on the site maps which are linked at the bottom of this page. In December 2000 the Washington loops of the system became lit and operational. In the future, NoaNet may include or interconnect with additional parts of the BPA system, in Oregon, Idaho and Montana.

As NoaNet expands its network it will add modern and efficient lasers to the unlit fiber it leases from BPA and others. Utility members and wholesale customers of NoaNet will develop and operate communication systems within their own service areas that will connect with the NoaNet backbone system. Rural areas often are not economically attractive markets for investments by telecommunication companies. Since NoaNet's licensed fibers run mainly through rural areas, this new system is well suited to meet the future telecommunication needs of rural communities. By providing access to advanced broadband telecommunication facilities on an open, cost based principle, NoaNet promises to help open a world of opportunities for utilities, wholesale customers and the rural communities they serve in the Pacific Northwest.



After you get a connection to the Internet/Intranet:

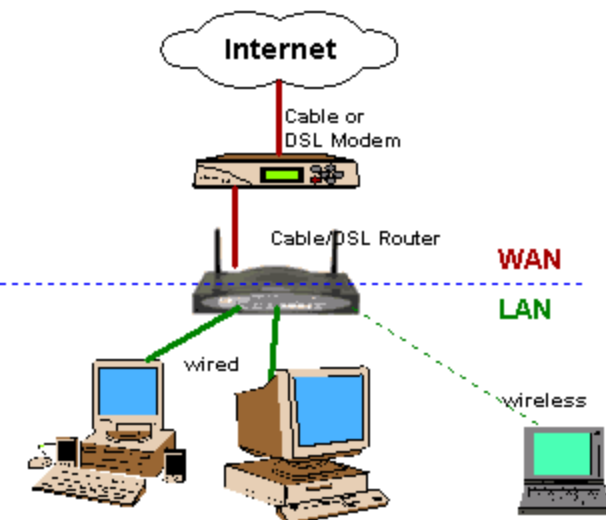
You need a connection to the devices that communicate over the IP connection. Various methods exist:

1. Wired Networking
2. Fiber Networking
3. Wireless Networking
4. HomePlug Networking

These are a few technologies in use today.

Electric Utilities choosing to utilize wideband data highways to the distributed resources of today and tomorrow need to consider the fact that the resources are expected to exist in or near the average residential facility, as **RETRO-FIT** installation.

Within existing facilities WI-FI Wireless Spread spectrum Radio IEEE 802.11 type networks are becoming very prevalent. Data rates up to 54Mbits per second are supported in the 802.11a standard.



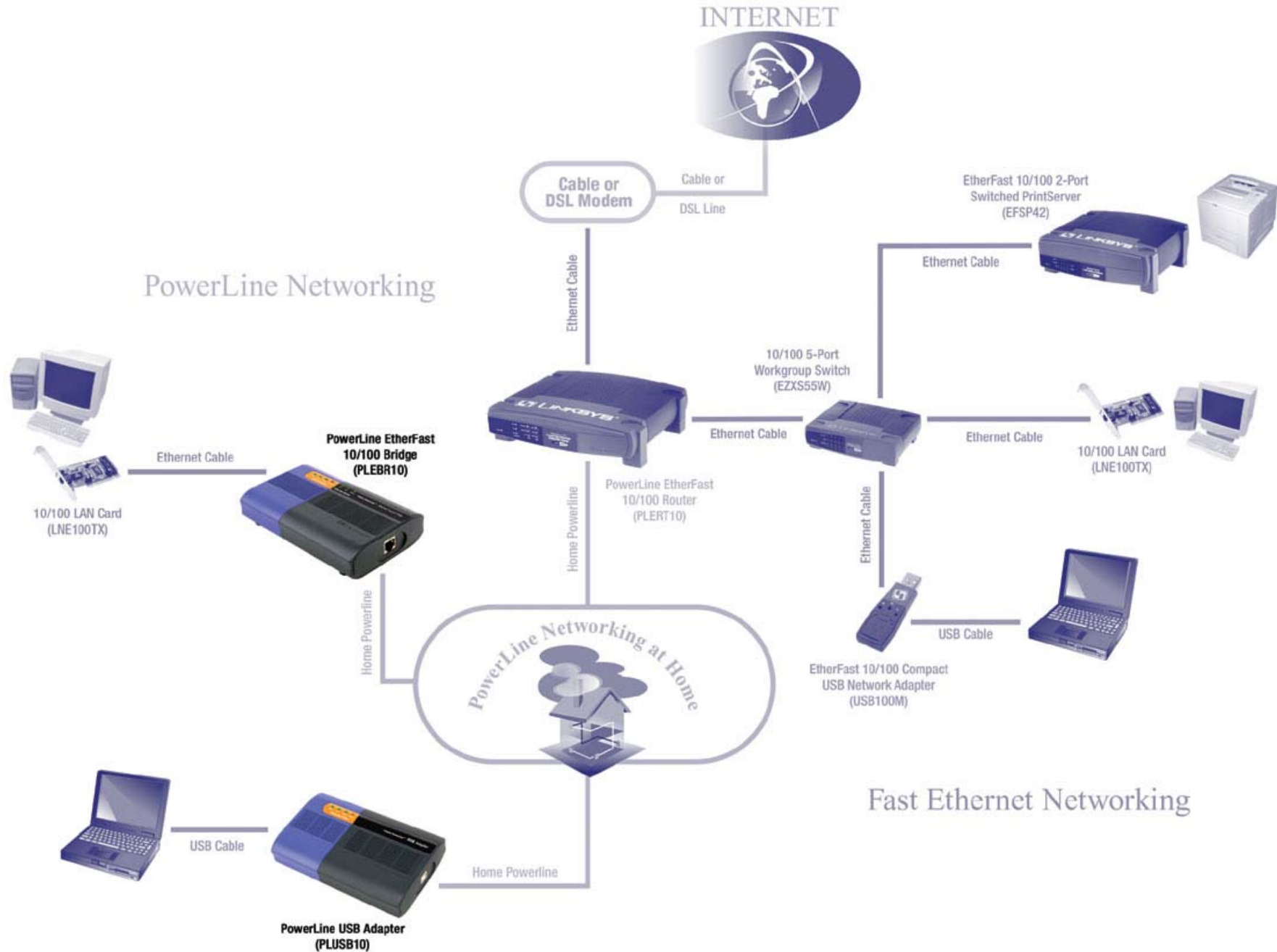
“Peer-to-peer” technology and “Access Point-to-node” technology are possible with the 802.11 standards for communications.

64 & 128 bit encryption is available to keep unwanted viewing of the data traveling on the network.



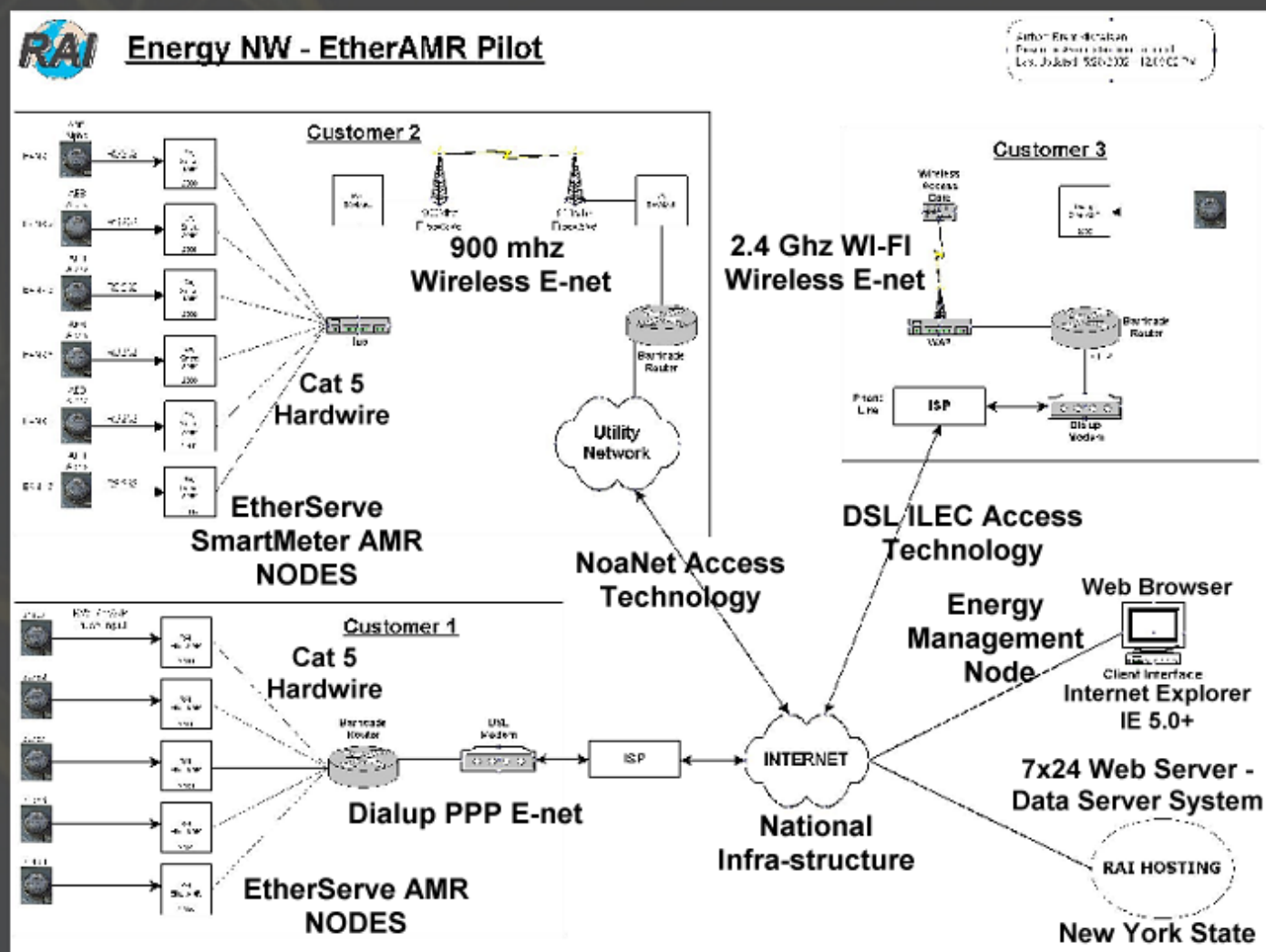
An Emerging Technology is the wideband **HomePlug Power Line Carrier** technology.

This “data on the wire” technology has a data rate of 6 Mbits/sec in the initial versions.



A Multi - Technology Communication Example

Energy NW's Pilot Project



PNGC POWER



ABOUT PNGC

Who we are
What we do
What it means to you
News/releases
Contact us
Directions

POWER SUPPLY

Power Contact Info
Surplus Power Sales
Financial Info

GREEN POWER

Coffin Butte
Co-op programs
Articles

NEW THINKING

Fuel cells
Microturbine testing
Slice of the System
New transmissions

CONSERVATION

Energy efficiency



Welcome to our Web site.

PNGC is a not-for-profit private energy services cooperative serving member utilities and other clients in the Pacific Northwest. We were founded on the premise that smaller electric utilities could do collectively what none of them could do separately.

Our success today is proof that shared effort means shared opportunity. PNGC Power's rock-solid membership consists of 15 rural electric cooperatives. Meanwhile, increasing numbers of non-members are turning to us for power services. They've discovered that we're Smart. Local. Connected. Find out more here at our Web site.

PNGC 2001 Corporate Profile

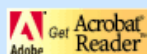
We now have our 2001 Corporate Profile available for download as a PDF or a text version offered in MS Word.



[Click to download PDF of PNGC Corporate Profile.](#)



[Click to download MS Word document of profile.](#)



If you do not have [Acrobat Reader](#), click here for FREE download.

- **Slice of the System**

PNGC Power and its members have just signed new power supply contracts with the Bonneville Power Administration (BPA) which will take the place of existing contracts which expire on September 30th, 2001. Those 10 year contracts give PNGC's members the opportunity to take advantage of "Slice of the System" contracts with Bonneville, which will provide a new way for our customers to take advantage of low-cost federal hydropower.

What is Slice of the System?

Slice is a new BPA product for serving the firm electric loads of preference customers. Slice is a generation-based product that gives purchasers access to a percentage of the output from the federal hydro system. In effect, Slice of the System participants take responsibility for managing their electric load rather than having BPA manage their load requirements. Slice is a cost-based product requiring a commitment of 10 years. The utility pays BPA for a share of BPA's Power Business Line revenue requirements and, in turn, is granted access to manage a percentage of the federal hydro system. [Read more about Slice of the System.](#)

How it works

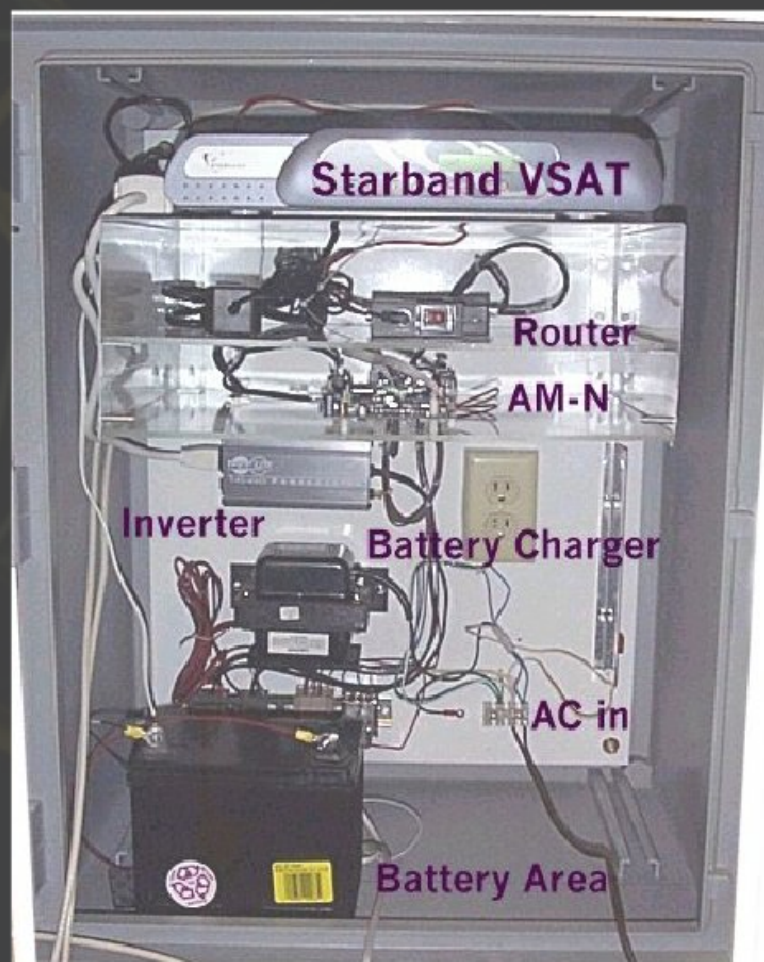
Slice is designed to meet a utility's firm load with critical water output from the federal hydro system supplemented with other resources and market purchases when necessary. When Slice output is less than a utility's load, the utility purchases additional power on the wholesale power market.

When Slice output exceeds a utility's load, the utility sells the surplus on the wholesale power market. Slice of the System is well aligned with PNGC's business model of creating value for members by joining forces to compete more efficiently. The combined PNGC member loads are relatively constant over the year and complement the BPA generation output, making it possible for all members to benefit from Slice where any single system could not succeed alone.

Contact at PNGC for additional Details:

Kevin Watkins, VP

Energy Management

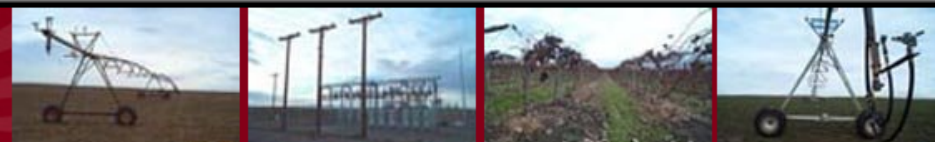


EtherSCADA / EtherAMR

Base Module



The Remote Node Component

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Welcome to Columbia REA's website. We hope that you find this site informative and that it provides you with all the information you need about our cooperative. This site was designed to allow you to easily access information about the cooperative, its employees, board of directors, and its programs and services.

Use the tool bar to the left to find the topic that you are interested in learning about. Click on the topic and you will be taken to the specific information that you are seeking. Some pages will contain an index of subtopics. Click on any item in an index and you will be taken to the information for that subtopic. You will notice photographs across the top of each page that you visit. These photos are of our service area, member facilities, employees and board members.

We encourage you to contact us if you do not find the information that you need on this site. We will also appreciate your feedback about the site design, ease of use, or any problems that you encounter using the site. To contact us, click on 'Contact Us' on the tool bar to the left.

Thank you for visiting us and welcome to Columbia REA!



Touchstone Energy®

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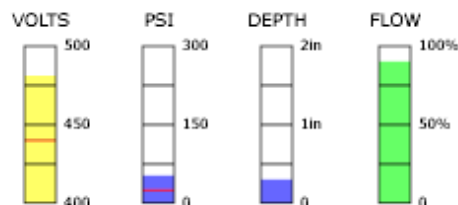
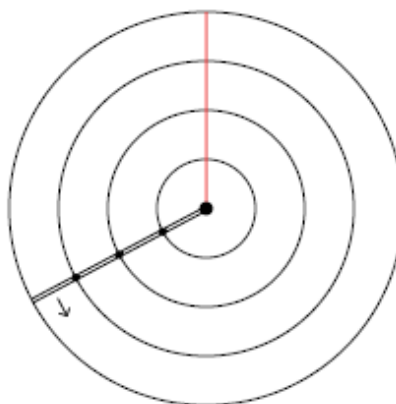
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Status
[Config Comm](#)
[Alerts Log](#)
[Config Alerts](#)

16:30:07	242..DEG	STOPPED
09/26/2001	52..PSI	*REVERSE*
481 VOLTS	90%	WATER ON
7 HR	0.3IN	SIS...OFF



Ready for Command...

START	STOP
FORWARD	REVERSE
SIS ON	SIS OFF
WATER ON	WATER OFF

Stop In Slot	OK	FAULT	ENABLED	DISABLED
Daily Operations	OK	FAULT	ENABLED	DISABLED
Wind Control	OK	FAULT	ENABLED	DISABLED
Power	OK	FAULT		
Safety	OK	FAULT		
Pressure	OK	FAULT		
Pressure Switch	OPEN	CLOSED		
Auto Restart	ON	OFF		
End Gun	ON	OFF		
Auxiliary IN 1	ON	OFF		
Auxiliary IN 2	ON	OFF		
Auxiliary OUT 1	ON	OFF		
Auxiliary OUT 2	ON	OFF		

EtherServe™ Products

EtherSCADA™

EtherAMR™

EtherServe Modem™

Upside Down SCADA

**THE TOTAL ENERGY MANAGEMENT SOLUTION
FOR
DISTRIBUTED RESOURCE COMMAND, CONTROL
AND ENERGY DATA MANAGEMENT**

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